

CLAIMS

What is claimed:

1. A power tong for coupling and uncoupling tubular members comprising:
 - (a) at least one rotary plate with a U-shaped cavity adapted to receive a tubular member coaxially with the rotary plate;
 - (b) a housing compatible with and supporting the rotary plate;
 - (c) three chordal segments each having a toothed arc and a chordal edge with multiple recesses;
 - (d) a gripping element supported in each of the multiple recesses for engagement with the tubular member;
 - (e) said chordal segments pivotally mounted on the rotary plate and spaced at equiradii, one segment centered at the base of the cavity on a diameter bisecting the cavity and the other two segments on opposed sides of the cavity each at an equiangular displacement exceeding ninety degrees from the one segment; and
 - (f) a drive mechanism for pivoting the chordal segments until one of the gripping elements of each engage the tubular member and thereafter imparting rotation of the rotary plate with the chordal segments for coupling or uncoupling the tubular member from another held stationary.
2. The apparatus of Claim 1 wherein the one segment is linked with the other two segments by straps to insure synchronous rotation of the three chordal segments.

3. The apparatus of Claim 1 wherein the drive mechanism includes a chain engaging the toothed arc of each chordal segment driven by a motive power unit.
4. The apparatus of Claim 3 wherein the motive power unit is a power hydraulic motor.
5. The apparatus of Claim 1 wherein the gripping elements are adjustable to various diameter tubular members by insertion of spacers behind the gripping elements in the recesses.
6. The apparatus of Claim 1 wherein the multiple recesses consist of two pairs of recesses, one of the pair supporting gripping elements for coupling and uncoupling one range of sizes of tubular members and the other of the pair supporting gripping elements for coupling and uncoupling a second range of sizes of tubular members.
7. The apparatus of Claim 1 wherein two rotary plates are spaced apart and retain the three chordal segments therebetween.
8. A power tong for coupling and uncoupling tubular members comprising:
 - (a) a housing for supporting a rotary mechanism with a cavity adapted to receive a tubular member coaxially with the rotary mechanism;
 - (b) three gear segments each having a toothed arc and chordal edge with at least two recesses;
 - (c) a gripping element supported in each of the two recesses for engagement with the tubular member;
 - (d) said chordal segments pivotally mounted on the rotary mechanism and spaced at equiradii, one segment centered at the base of the cavity and the

other two segments on opposed sides of the cavity each at an equiangular displacement exceeding ninety degrees from the one segment; and

(e) a drive mechanism mounted to the housing engaging the toothed arc of the gear segments to impart pivotal movement to the segments until engagement with the tubular member, then rotary movement to the rotary mechanism.

9. The apparatus of Claim 8 wherein the one segment is linked with the other two segments by straps to insure synchronous rotation of the three chordal segments.

10. The apparatus of Claim 8 wherein the drive mechanism includes a chain engaging the toothed arc of each segment driven by a motive power unit.

11. The apparatus of Claim 10 wherein the motive power unit is a power hydraulic motor.

12. The apparatus of Claim 8 wherein the gripping elements are adjustable to various diameter tubular members by insertion of spacers behind the gripping elements in the recesses.

13. The apparatus of Claim 8 wherein the multiple recesses consist of two pairs of recesses, one of the pair supporting gripping elements for coupling and uncoupling one range of sizes of tubular members and the other of the pair supporting gripping elements for coupling and uncoupling a second range of sizes of tubular members.

14. A power tong for coupling and uncoupling tubular members comprising:

(a) a rotary framework with a U-shaped cavity adapted to receive a tubular member coaxially with the rotary framework;

(b) a housing compatible with and supporting the framework;

(c) three chordal segments each having a toothed arc and a chordal border with multiple recesses;

(d) a gripping element supported in each of the multiple recesses for engagement with the tubular member;

(e) said chordal segments pivotally mounted from the rotary framework and spaced at equiradii, one segment centered at the base of the cavity on a diameter bisecting the cavity and the other two segments on opposed sides of the cavity each at an equiangular displacement exceeding ninety degrees from the one segment; and

(f) a drive mechanism for pivoting the chordal segments until one of the gripping elements of each engage the tubular member and thereafter imparting rotation of the entire rotary framework with the chordal segments for coupling or uncoupling the tubular member from another held stationary.

15. The apparatus of Claim 14 wherein the multiple recesses consist of two pairs of recesses, one of the pair supporting gripping elements for coupling and uncoupling one range of sizes of tubular members and the other of the pair supporting gripping elements for coupling and uncoupling a second range of sizes of tubular members.